

September 15, 2006 Letting
Call #302
Contract ID 061047
Jefferson County

Question:

Through the Freedom of Information Act, we are requesting that all “HT” steel information including all test results performed on the “HT” steel for the Kennedy Bridge be released to all prospective bidders through the form of an addendum for Call Number 302 of the September 15, 2006 letting (Contract ID 061047). On page 9 of the plans (File 051.tif electronic), it gives the material designation for “HT” steel as “High Yield Strength Structural Steel, See Special Provisions, per. 5.2.2- I & J.” There are no special provisions nor ASTM Standard to refer to so could you please provide this information.

The box girders on the truss have reinforcing steel plates inside of them that divide the box into two parts. In the areas of the box girders designated as “HT” steel, please advise if the reinforcing steel plates in these areas are also “HT” steel or something other.

It was mentioned briefly by Greta Smith in the August 28, 2006 preconstruction meeting that there was 10% “HT” steel by weight on the Kennedy Bridge. In page 2 of the plans (File 058.tif electronic) it gives the total weight of steel at 21,880,000 lbs and the weight of “HT” steel at 5,829,000 lbs. This comes to approximately 26.6% “HT” steel.

Please advise how KYTC arrived at the 10% figure because it appears to be substantially low. There also needs to be a better understanding of how much square footage of “HT” steel is on the structure as opposed to percentage by weight.

Answer:

Attached are three charts depicting testing results obtained from the bridge. These charts give an *indication* of the material to be encountered on the bridge. Our previous testing confirmed that the bridge was built according to plans from which the various members and the materials used are indicated. Any cover plates or ‘reinforcing steel plates’ should be assumed to be made of the same material as the main member. The HT designation of the steel was terminology used by the Cabinet when the Kennedy Bridge was built in the 1960’s and KYTC has not maintained the appropriate Special Provisions listed in the plans. It is believed to be a high tensile strength steel (as testing has confirmed) with a certain degree of hardness that mostly aligns itself with A514 Grade B Steel (USS “T-1” Type A).

At the Prebid meeting Ms. Smith did give an indication of the amount of HT steel on the bridge as “approximately 25% by weight” for which your numbers confirmed. The contractor may make his own determination of the square footage involved based upon the members depicted in the plans. Please keep in mind that this information is given to assist the contractor, but it will *remain his responsibility* to make his own determination as to the conditions he will encounter

on the bridge. No consideration would be given to claims of differing site conditions due to existing steel/mill scale/paint/rust/etc.

HARDNESS

Indentation hardness of steel is directly proportional to the steel strength, therefore Rockwell indentation hardness tests were made on each sample. Results are shown below with the equivalent tensile strength for each sample.

<u>Sample ID</u>	<u>HRBW</u>	<u>HRC</u>	<u>Equiv Tensile Strength (psi)</u>
F-61-16-1	85		83,000
F-61-16-2		26	126,000
F-61-16-3		29	138,000
F-61-16-4		24	122,000
F-61-16-5		27	131,000
F-61-16-6	79		73,000

These data show samples 1 and 6 to have hardness and strength in the range expected for hot rolled steel. Samples 2, 3, 4, and 5 have been heat treated to increase hardness and strength above that expected for hot rolled steel.

TABLE 1

CHEMICAL ANALYSIS
OES (Optical Emission Spectroscopy)
Weight (%)

<u>Reference Standards</u>								
	<u>A441/572</u>	<u>A373/A36</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Carbon	0.26x	0.25x	0.07	0.20	0.19	0.17	0.18	0.10
Manganese	1.35x	1.2x	1.36	0.98	0.98	0.99	0.92	0.94
Silicon	0.40	0.40	0.26	0.25	0.26	0.27	0.24	0.38
Phosphorus	0.04x	0.04x	0.017	0.008	0.010	0.013	0.020	0.014
Sulfur	0.05x	0.05x	0.023	0.017	0.024	0.031	0.028	0.008
Copper	NS	0.20 min.	0.33	0.03	0.02	0.03	0.02	0.29
Chromium	NS	NS	0.53	0.51	0.52	0.57	0.56	0.53
Nickel	NS	NS	0.30	0.08	0.03	0.09	0.06	0.16
Vanadium	NS	NS	0.03	0.04	0.04	0.04	0.04	0.03
Molybdenum	NS	NS	0.03	0.21	0.20	0.21	0.20	0.01

A36 = Copper 0.20% minimum when specified.

Table 3. List of steel core samples with ASTM Designations.

Sample ID	Predicted Steel **	ASTM Designation	
Core #1	A441	A441	
Core #4	A441	A441	
Core #2	A373	A373	
Core #3	A373	A373	
Core #5	A373	A373	
Core #6	A373	A373	
Core #7	HT	A514 Grade B USS "T-1" Type A	
Core #8	HT	A514 Grade B USS "T-1" Type A	

**Predicted Steel designations are as listed in the Bridge Plans 1